MULTIMEDIA UNIVERSITY ®

STUDENT ID NO

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# MULTIMEDIA UNIVERSITY

# FINAL EXAMINATION

**TRIMESTER 1, 2022 / 2023 (TERM ID 2210)**

## BAP1014 – ANALYTICAL PROGRAMMING

(All sections / Group)

9th FEBRUARY 2023
9.00a.m. –11.00a.m.
(2 Hours)

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**INSTRUCTIONS TO STUDENT**

1. This question paper consists of 4 pages (excluding cover page) with 4 Questions only.

2. Attempt **ALL** questions in Section A and Section B. The distribution of the marks for each question is given.

3. Write your answers in the Answer Booklet.

4. This is an open book examination. You are allowed to bring Jovian Python code for your references.

## SECTION A.

**Instructions:** Answer **ALL** questions. Write your answers in the Answer Booklet.

### QUESTION 1 [20 Marks]

a. Write a Pandas program to calculate the sum of the examination attempts by the students.

*Sample DataFrame*:
exam_data = {'name': ['Anastasia', 'Dima', 'Katherine', 'James', 'Emily', 'Michael', 'Matthew', 'Laura', 'Kevin', 'Jonas'],
'score': [12.5, 9, 16.5, np.nan, 9, 20, 14.5, np.nan, 8, 19],
'attempts': [1, 3, 2, 3, 2, 3, 1, 1, 2, 1],
'qualify': ['yes', 'no', 'yes', 'no', 'no', 'yes', 'yes', 'no', 'no', 'yes']}
labels = ['a', 'b', 'c', 'd', 'e', 'f', 'g', 'h', 'i', 'j'] (10 marks)

b. Create a 5X2 integer array from a range between 100 to 200 such that the difference between each element is 10

Expected Output:
[[100 110]
[120 130]
[140 150]
[160 170]
[180 190]]

(10 marks)

### QUESTION 2 [20 Marks]

**a. Following is the provided numPy array. Write the code to return array of items by taking the third column from all rows**

sampleArray = numpy.array([[11 ,22, 33], [44, 55, 66], [77, 88, 99]])

Expected Output:
Printing Input Array
[[11 22 33]
[44 55 66]
[77 88 99]]

Printing array of items in the third column from all rows
[33 66 99] (10 marks)

**b. Write a program to display only those numbers from a list that satisfy the following conditions**

**Continued...**

- **The number must be divisible by five**
- **If the number is greater than 150, then skip it and move to the next number**
- **If the number is greater than 500, then stop the loop**

**Given:**

numbers = [12, 75, 150, 180, 145, 525, 50]

**Expected output:**
75
150
145

(10 marks)

**Continued...**

**SECTION B.**

**Instructions:** Answer **1** question ONLY. Write your answers in the Answer Booklet.

**QUESTION 1 [40 Marks]**

a. Write a Pandas program to select the rows where the number of attempts in the examination is greater than 2.

Sample Python dictionary data and list labels:
exam_data = {'name': ['Anastasia', 'Dima', 'Katherine', 'James', 'Emily', 'Michael', 'Matthew', 'Laura', 'Kevin', 'Jonas'],
'score': [12.5, 9, 16.5, np.nan, 9, 20, 14.5, np.nan, 8, 19],
'attempts': [1, 3, 2, 3, 2, 3, 1, 1, 2, 1],
'qualify': ['yes', 'no', 'yes', 'no', 'no', 'yes', 'yes', 'no', 'no', 'yes']}
labels = ['a', 'b', 'c', 'd', 'e', 'f', 'g', 'h', 'i', 'j']

Expected Output:
Number of attempts in the examination is greater than 2:
name score attempts qualify
b Dima 9.0 3 no
d James NaN 3 no
f Michael 20.0 3 yes (20 marks)

b. Write a Pandas program to convert a NumPy array to a Pandas series.
Sample NumPy array: d1 = [10, 20, 30, 40, 50]

Expected Output:
NumPy array:
[10 20 30 40 50]
Converted Pandas series:
0 10
1 20
2 30
3 40
4 50
dtype: int64

(20 marks)

**Continued...**

**QUESTION 2 [20 Marks]**

a. Write a Pandas program to sort the data frame first by 'name' in descending order, then by 'score' in ascending order.

*Sample DataFrame*:
exam_data = {'name': ['Anastasia', 'Dima', 'Katherine', 'James', 'Emily'],
'score': [12.5, 9, 16.5, np.nan, 9],
'attempts': [1, 3, 2, 3, 2],
'qualify': ['yes', 'no', 'yes', 'no', 'no']}
labels = ['a', 'b', 'c', 'd', 'e']
Values for each column will be:
name : 'Suresh', score: 15.5, attempts: 1, qualify: 'yes', label: 'k'

Sample Output:

| | name | score | attempts | qualify |
|---|---|---|---|---|
| **a** | Anastasia | 12.5 | 1 | yes |
| **b** | Dima | 9.0 | 3 | no |
| **c** | Katherine | 16.5 | 2 | yes |
| **d** | James | NaN | 3 | no |
| **e** | Emily | 9.0 | 2 | no |

(20 marks)

**End Page...**